0.1 XSLD - Stereo Linker Association Module (SLAM) Bank

Data from three SL3 , three SL5, and three SL7 stereo finder boards are sent to a given SLAM board which uses the stereo pixels to confirm axial tracks sent from a single linker board. The data are divided into 3 blocks corresponding to the 3 VME crates of SLAM cards, 8 per crate. The structure of the XSLD bank is given in Table 1, and the format of the data for each SLAM board is given in Table 2.

The first four words are read out on the VME interface chip on the SLAM board. The structure of that words is as follows.

Bit	Function
7:0	Beam Crossing Counter
12:8	Geographical Address (Slot)
13	Beam 0 Marker
19:14	Brd Serial Number (not implemented yet?)
31:20	Brd Type
31:0	Unspecified? (Linker and VME versions in Linker)
31:0	Unspecified? (Input and Output chip version in Linker)
31:0	Unspecified? (Error flags and counters in Linker)

Each SLAM board receives data from 12 linker chips (one linker board), where a linker chip covers a 1.25° section of azimuth. The SLAM board uses the same track word format as the linker board, but replaces the "isolation" bit (actually the 4-layer track bit) with the stereo confrimation bit. The format of the first 4 SLAM words is:

"XSLD"
Bank Number
Bank Version
Bank Length
Bank Type (I*4)
Number of Blocks (=3)
Pointer to Block 0 – $270° < \phi < 30°$
Pointer to Block 1 – $30° < \phi < 150°$
Pointer to Block 2 – $150° < \phi < 270°$
Pointer to End of Data
Block 0: Number of Cards (=8)
Pointer to Card 0
...
Pointer to Card 7
Pointer to End of Block
SLAM Data
...
Block 1: Number of Cards (=8)
Pointer to Card 0
...
Pointer to Card 7
Pointer to End of Block
SLAM Data
...
Block 2: Number of Cards (=8)
Pointer to Card 0
...
Pointer to Card 7
Pointer to End of Block
SLAM Data
...

Table 1: *Structure of the XSLD bank. Nominally there are 8 cards per block, but it is possible for cards to be missing. Card order may vary. One should identify the cards in the bank using the slot ID and block position.*

Offset	Description
$P_m + Q_n + 0$	VME Header Word 0
$P_m + Q_n + 1$	VME Header Word 1
$P_m + Q_n + 2$	VME Header Word 2
$P_m + Q_n + 3$	VME Header Word 3
$P_m + Q_n + 4$	SLAM Output Word 0
$P_m + Q_n + 5$	SLAM Output Word 1
$P_m + Q_n + 6$	SLAM Output Word 2
$P_m + Q_n + 7$	SLAM Output Word 3
$P_m + Q_n + 8$	SLAM Output Word 4
$P_m + Q_n + 9$	SLAM Output Word 5
$P_m + Q_n + 10$	SLAM Output Word 6
$P_m + Q_n + 11$	SLAM Output Word 7
$P_m + Q_n + 12$	Pixel data from stereo finder 3A, cell 0 and 3B, cell 0
$P_m + Q_n + 13$	Pixel data from stereo finder 3A, cell 1 and 3B, cell 1
. . .	
$P_m + Q_n + 29$	Pixel data from stereo finder 3A, cell 17 and 3B, cell 17
$P_m + Q_n + 30$	Pixel data from stereo finder 3C, cell 0 and 5A, cell 0
$P_m + Q_n + 31$	Pixel data from stereo finder 3C, cell 1 and 5A, cell 1
. . .	
$P_m + Q_n + 47$	Pixel data from stereo finder 3C, cell 17 and 5A, cell 17
$P_m + Q_n + 48$	Pixel data from stereo finder 5B, cell 0 and 5C, cell 0
$P_m + Q_n + 49$	Pixel data from stereo finder 5B, cell 1 and 5C, cell 1
. . .	
$P_m + Q_n + 65$	Pixel data from stereo finder 5B, cell 17 and 5C, cell 17
$P_m + Q_n + 66$	Pixel data from stereo finder 7A, cell 0 and 7B, cell 0
$P_m + Q_n + 67$	Pixel data from stereo finder 7A, cell 1 and 7B, cell 1
. . .	
$P_m + Q_n + 83$	Pixel data from stereo finder 7A, cell 17 and 7B, cell 17
$P_m + Q_n + 84$	Pixel data from stereo finder 7C, cell 0 (lower 16 bits, upper 16 bits unused)
$P_m + Q_n + 85$	Pixel data from stereo finder 7C, cell 1 (lower 16 bits, upper 16 bits unused)
. . .	
$P_m + Q_n + 100$	Pixel data from stereo finder 7C, cell 16 (lower 16 bits, upper 16 bits unused)
$P_m + Q_n + 101$	Pixel data from stereo finder 7C, cell 17 (lower 16 bits, upper 16 bits unused)

Table 2: *Structure of data for a single SLAM board in the XSLD bank. P_m is the offset to block m. Q_n is the offset the board n within the block.*

SLAM Word	Linker Word	Bit	Function
0	0	12:0	Track data (Linker 0)
0	0	23:13	Track data (Linker 1)
1	0	12:0	Track data (Linker 6)
1	0	23:13	Track data (Linker 7)
2	1	12:0	Track data (Linker 4)
2	1	23:13	Track data (Linker 5)
3	1	12:0	Track data (Linker 10)
3	1	23:13	Track data (Linker 11)
4	2	12:0	Track data (Linker 2)
4	2	23:13	Track data (Linker 3)
5	2	12:0	Track data (Linker 8)
5	2	23:13	Track data (Linker 9)
6	3	1:0	Word Marker
6	3	7:2	Duplicate Trk Rem (Linker 0-5)
6	3	8	Beam Zero Marker
6	3	9	Linker Error Flag
6	3	10	SLAM confirmation (Linker 0)
6	3	11	SLAM confirmation (Linker 1)
6	3	12	SLAM confirmation (Linker 2)
6	3	13	SLAM confirmation (Linker 3)
6	3	14	SLAM confirmation (Linker 4)
6	3	15	SLAM confirmation (Linker 5)
6	3	23:16	Beam Crossing Counter
7	3	1:0	Word Marker
7	3	7:2	Duplicate Trk Rem (Linker 6-11)
7	3	8	Beam Zero Marker
7	3	9	Linker Error Flag
7	3	10	SLAM confirmation (Linker 6)
7	3	11	SLAM confirmation (Linker 7)
7	3	12	SLAM confirmation (Linker 8)
7	3	13	SLAM confirmation (Linker 9)
7	3	14	SLAM confirmation (Linker 10)
7	3	15	SLAM confirmation (Linker 11)
7	3	23:16	Beam Crossing Counter

The track data format is identical to what is used in the liner. Please see the XFLD section for details.

Each SLAM board reports the stereo pixel data input via fiber to each of the nine optical receivers on the board. For SL3, each fiber carries pixel data for 10 cells. For SL7, each fiber carries data for 18 cells. The fibers for SL5 alternate between 10 cells and 18 cells as one goes around in phi, starting with 18 cells on fiber input 5A of the SLAM in block 0, slot 5. The "First word marker" marks the first word for on a fiber an event and the "Last word marker" marks the last (i.e. 10th or 18th) word on a fiber in an event. The

format of the stereo pixel data word is:

Bit	Function
11:0	Stereo Finder Fiber "X", cell i
12	B0 marker
13	Error marker
14	Last word marker
15	First word marker
27:16	Stereo Finder Fiber "Y", cell i
28	B0 marker
29	Error marker
30	Last word marker
31	First word marker

Where "X" and "Y" are the two fibers given in Table 2, i.e. 3A and 3B, 3C and 5A, 5B and 5C, 7A and 7B, and 7C and unused, respectively. Note: for the words containing data for 7C, the upper bits (31:16) are filled with "3C."

Here is the slot mapping of the 24 SLAM Boards in XSLD:

SLAM Board	Block	Slot	Phi Range
0	0	5	270-285 deg
1	0	7	285-300 deg
2	0	9	300-315 deg
3	0	11	315-330 deg
4	0	13	330-345 deg
5	0	15	345-360 deg
6	0	17	0-15 deg
7	0	19	15-30 deg
8	1	5	30-45 deg
9	1	7	45-60 deg
10	1	9	60-75 deg
11	1	11	75-90 deg
12	1	13	90-105 deg
13	1	15	105-120 deg
14	1	17	120-135 deg
15	1	19	135-150 deg
16	2	5	150-165 deg
17	2	7	165-180 deg
18	2	9	180-195 deg
19	2	11	195-210 deg
20	2	13	210-225 deg
21	2	15	225-240 deg
22	2	17	240-255 deg
23	2	19	255-270 deg